920476-904808

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of	:	Paul Anthony Kirby
Serial No.	:	09/862,861
Filed	:	May 22, 2001
For	:	Management and Control of Multi-Layer Networks
Examiner	:	HSU, ALPUS
Art Unit	:	2665
Customer number	:	23644

RESPONSE TO FINAL OFFICE ACTION DATED MAY 9, 2006

Honorable Director of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Examiner's final Office Action of May 9, 2006, it is requested that the application be amended as follows:

In the Claims

Claims are amended as follows:

1. (previously presented) A method of allocating resources in a network having multiple resource-allocation transport layers and in which a first transport layer requires resources provided by a second of said transport layers, the method comprising the steps of:

at said first transport layer, providing an indication to the second transport layer of said required resources to be allocated from said second transport layer;

at said second transport layer automatically offering said required resource together with a condition for use of those resources; and

at said first transport layer determining if the condition for use of the offered resources is acceptable and, if so, automatically accepting the offered resources from the second transport layer.

2. (original) A method as claimed in claim 1, wherein said condition includes a price for use of said offered resources.

3. (original) A method according to claim 2 additionally comprising the step of:

varying said price responsive to said request and to availability of said resources.

4. (previously presented) A method according to claim 1 wherein said ~~price~~ acceptability is determined by said first transport layer according to a pre-determined allocation policy.

5. (original) A method according to claim 3 additionally comprising the step of:

monitoring a characteristic effect of said allocation policy;

varying said allocation policy responsive to said characteristic.

6. (original) A method as claimed in claim 3, wherein said network incorporates a multi-wavelength transport layer.

7. (original) A method as claimed in claim 6, wherein traffic ingress to said multi-wavelength transport layer is controlled via a virtual port.

8. (original) A method as claimed in claim 7, wherein said virtual port provides access to a plurality of real ports one for each wavelength transported on the multi-wavelength transport layer.

9. (original) A method as claimed in claim 8, wherein said virtual port distributes traffic to said real ports so as to balance the loading of the real ports.

10. (original) A method as claimed in claim 9, wherein an ingress control of said virtual port advertises an ingress access price for bandwidth use in the multi-wavelength transport layer.

11. (original) A method as claimed in claim 10, wherein the ingress control of said virtual port allocates ingress traffic to one or more individual wavelengths in the multi-wavelength transport layer according to a current bandwidth price for access to the multi-wavelength transport layer.

12. (original) A method as claimed in claim 11, wherein said multi-wavelength transport layer provides supertrunks between ingress and egress ports.

13. (currently amended) A method of allocating resources in a communications network having a hierarchy of transport layers, each said transport layer having its own resource capacity, the method comprising; determining within [[a]] said transport layer whether that transport layer has sufficient resources to support a request for

service, and, where ~~th at~~ that transport layer has insufficient resources to support a request for service, automatically requesting further resources from one or more other said transport layers, wherein a demand oriented price for requested resource use is determined by each said transport layer, and wherein said price is offered by that layer to any other layer requesting use of that resource.

14. (cancelled)

15. (previously presented) A method as claimed in claim 13, wherein allocation of resources from one transport layer to another is determined by a customer willingness to pay the current price for those resources.

16. (previously presented) A method as claimed in claim 15 wherein the network resources are allocated so as to provide substantially uniform resource use both horizontally across each said transport layer and vertically over said hierarchy of transport layers.

17. (currently amended) A method of managing a communications network having a multi-layer hierarchical transport structure having a hierarchy of transport layers in which the or each transport layer of the hierarchy can provide a transport service to one or more other layers of the network, the method comprising negotiating between said transport layers to determine a network resource allocation and a resource price to be offered to a customer for admission to the network and utilisation of said resource allocation.

18. (previously presented) A method as claimed in claim 17, wherein a demand oriented price for requested resource use is determined by the or each said transport layer, and wherein said price is offered by that transport layer to any other layer of the network requesting use of that resource.

19. (currently amended) A method of managing a communications network having a multi-layer hierarchical transport structure having a hierarchy of transport layers in which the or each transport layer of the hierarchy can provide a transport service to one or more other layers of the network, the method comprising negotiating automatically between said transport layers to determine a network resource allocation and a resource price to be offered to a customer for admission to the network and utilisation by the customer of said resource allocation.

20. (currently amended) A communications network having a multi-layer hierarchical transport structure having a hierarchy of transport layers in which the or each transport layer of the hierarchy can provide a transport service to one or more other layers of the network, and having a management arrangement for negotiating automatically between said transport layers to determine a network resource allocation and a resource price to be offered to a customer for admission to the network and utilisation by the customer of said resource allocation.

21. (previously presented) A layered resource-allocation transport system comprising:

a first transport layer comprising a topology manager arranged to provide an indication of resources required by the first transport layer and an indication of willingness to pay for said required resources;

a second transport layer comprising a service manager arranged to provide said resources responsive to a comparison between said willingness to pay and a price of said required resources.

22. (previously presented) A communications network having multiple resource-allocation transport layers and incorporating a management structure for allocating resources to allocate resources requested by a first transport layer of said transport layers from a second of said transport layers, the management structure being arranged to:

at said first transport layer, provide an indication to the second transport layer of said required resources to be allocated from said second transport layer;

at said second transport layer automatically offer said required resource together with a condition for use of those resources; and

at said first transport layer determine if the condition for use of the offered resources is acceptable and, if so, automatically accept the offered resources from the second layer.

23. (previously presented) A communications network having multiple resource-allocation transport layers and incorporating a resource allocation management structure for allocating requested resources between said transport layers, one of said multiple resource-allocation transport layers being a multi-wavelength transport layer to which controlled access is provided via one or more virtual ports, wherein each said virtual port provides access to a plurality of real ports one for each wavelength transported on the multi-wavelength transport layer, and wherein said virtual port distributes traffic to said real ports so as to balance the loading of the real ports.

24. (original) A network as claimed in claim 23, wherein an ingress control of said virtual port advertises an ingress access price for bandwidth use in the multi-wavelength transport layer.

25. (original) A network as claimed in claim 24, wherein the ingress control of said virtual port allocates ingress traffic to one or more individual wavelengths in the multi-wavelength transport layer according to a current bandwidth price for access to the multi-wavelength transport layer.

26. (original) A network as claimed in claim 25, wherein said multi-wavelength transport layer provides supertrunks between ingress and egress ports.

27. (original) A multi-layer communications network, comprising an upper Internet protocol (IP) layer, a multi-protocol label switched (MPLS) layer, a synchronous transport (SDH) layer, and an underlying multi-wavelength optical transport layer, wherein each said layer has a respective manager arranged to manage resources within that layer, to respond to requests for service from other layer managers, to set a price for those service requests, and to request service from the other layer managers, and wherein an interlayer manager responsible for controlling the resource allocation and resource pricing of each said layer manager so as to optimise use of the resources within each said layer.

28. (original) A network as claimed in claim 27, wherein traffic ingress to said multi-wavelength transport layer is controlled via a virtual port.

29. (original) A network as claimed in claim 28, wherein said virtual port provides access to a plurality of real ports one for each wavelength transported on the multi-wavelength transport layer.

30. (original) A network as claimed in claim 29, wherein said virtual port distributes traffic to said real ports so as to balance the loading of the real ports.

31. (original) A network as claimed in claim 30, wherein an ingress control of said virtual port allocates ingress traffic to one or more individual wavelengths in the multi-wavelength transport layer according to a current bandwidth price for access to the multi-wavelength transport layer.

32. (original) A network as claimed in claim 31, wherein said multi-wavelength transport layer provides supertrunks between ingress and egress ports.

33. (previously presented) Software in machine readable form for allocating resources in a communications network having a hierarchy of transport layers, each

said transport layer having its own resource capacity, the software being arranged to perform the method of; determining within a said transport layer whether that transport layer has sufficient resources to support a request for service, and, where that transport layer has insufficient resources to support a request for service, automatically requesting further resources from one or more other said transport layers, wherein the software is arranged to determine a demand oriented price for requested resource use for each said transport layer, and wherein the software is arranged to offer said price on behalf of that layer to any other layer requesting use of that resource.

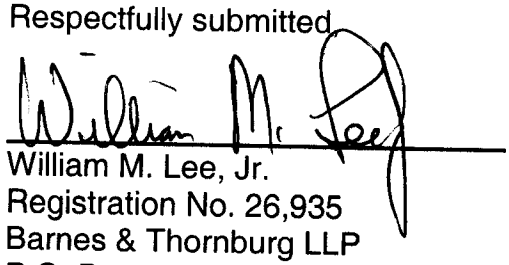
Remarks

In response to the May 9, 2006 Office Action, the changes proposed by the Examiner in numbered section 1 on page 2 of the Office Action have been effected above, and it is submitted that the entire application is now in condition for allowance.

Favorable reconsideration of the entire application is therefore urged.

June 19, 2006

Respectfully submitted,



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